

We claim:

1           1.     A laser device for generating laser pulses with an optically pumped  
2 semiconductor laser (1), comprising:  
3           an external resonator, and  
4           at least one mode-locker (10).

1           2.     The laser device as claimed in claim 1,  
2           wherein  
3           the semiconductor laser (1) is optically pumped by means of a pump radiation  
4 source (3) arranged externally.

1           3.     The laser device as claimed in claim 1,  
2           wherein  
3           the semiconductor laser (1) is optically pumped by means of a pump radiation  
4 source (3a, 3b) which is monolithically integrated into the semiconductor laser (1).

1           4.     The laser device as claimed in claim 1,  
2           wherein  
3           the mode-locker (10) is a passive mode-locker.

1           5.     The laser device as claimed in claim 4,  
2           wherein

3 the mode-locker (10) is a saturable absorber.

1 6. The laser device as claimed in claim 5,

2 wherein

3 the mode-locker is a saturable absorber made of a semiconductor material.

1 7. The laser device as claimed in claim 1,

2 wherein

3 the mode-locker (10) is monolithically integrated into the semiconductor laser (1).

1 8. The laser device as claimed in claim 1,

2 wherein

3 the mode-locker (10) is combined with a resonator mirror (9).

1 9. The laser device as claimed in claim 1,

2 wherein

3 the resonator has a device for phase compensation.

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1 10. The laser device as claimed in claim 1,

2 wherein

3 a device for phase compensation is arranged downstream of the resonator.

1           11.    The laser device as claimed in claim 9,  
2           wherein  
3           the device for phase compensation has at least one prism (14, 15, 16, 17), a  
4   grating, a linear or chirped mirror (19), a lens and/or an optical fiber.

1           12.    The laser device as claimed in claim 11,  
2           wherein  
3           the resonator has a chirped folding mirror (19).

1           13.    The laser device as claimed in claim 1,  
2           wherein  
3           the resonator has a first resonator branch for generating laser pulses having a  
4   fundamental wavelength  $\lambda_1$  and a second resonator branch for generating laser pulses  
5   having a fundamental wavelength  $\lambda_2$ .

1           14.    The laser device as claimed in claim 13,  
2           wherein  
3   the laser pulses having the fundamental wavelength  $\lambda_1$  and the laser pulses having the  
4   fundamental wavelength  $\lambda_1$  are coupled to one another in a phase-locked manner.

1           15.    The laser device as claimed in claim 1,  
2           wherein

3           the laser pulses have a pulse duration which is less than 100 ps, preferably less  
4   than 20 ps, particularly preferably less than 1 ps.

1           16.    The laser device as claimed in claim 1,  
2           wherein  
3           the laser device is a laser oscillator.

1           17.    The laser device as claimed in claim 1,  
2           wherein  
3           the laser device is a laser amplifier.

1           18.    The laser device as claimed in claim 17,  
2           wherein  
3           the laser amplifier is a CPA amplifier.

1           19.    The laser device as claimed in claim 1, wherein said mode-locker is  
2   arranged in said external resonator.

1           20.    The laser device as claimed in claim 1, wherein a portion of the mode-locker  
2   is arranged internally and part is arranged externally of the semiconductor laser.